

CLAIMS

1. A liquid injector for injecting a liquid into a patient from a syringe having a cylinder member and a piston member inserted slidably into the cylinder member, comprising:

a patient tube having a leading end connected to the patient;

a plurality of syringe tubes, each of their trailing ends being connected to each of a plurality of the syringes;

tube connecting means for connecting a trailing end of the patient tube to leading ends of a plurality of the syringe tubes;

a syringe hold member for removably holding a plurality of the syringes;

a plurality of syringe drive mechanisms, each of the mechanisms causing each of a plurality of the syringes to perform injection of the liquid by relatively moving the cylinder member and/or the piston member;

a plurality of tube block mechanisms, each of the mechanisms blocking each of a plurality of the syringe tubes to allow opening or closing thereof; and

interlock control means for interlocking operation of a plurality of the tube block mechanisms and a plurality of the syringe drive mechanisms to open only one of the syringe tubes and drive only one of the syringes associated with the opened syringe tube.

2. The liquid injector according to claim 1, wherein the number of each of the syringes, the syringe tubes, the syringe drive mechanisms, and the tube block mechanisms is two, and

the liquid injector further comprising an open or close interlock

mechanism for interlocking opening or closing operation of the two tube block mechanisms such that one of them is opened when the other is closed.

3. The liquid injector according to claim 2, wherein a first one of the tube block mechanisms has a first press member disposed movably at a position for pressing a first one of the syringe tubes and a first hold member disposed opposite to the first press member through the first syringe tube,

a second one of the tube block mechanisms has a second press member disposed movably at a position for pressing a second one of the syringe tubes and a second hold member disposed opposite to the second press member through the second syringe tube, and

the open or close interlock mechanism has a press slider member supported slidably and having the first press member and the second press member formed thereon to be integral therewith.

4. The liquid injector according to claim 2, wherein a first one of the tube block mechanisms has a first press member disposed movably at a position for pressing a first one of the syringe tubes and a first hold member disposed opposite to the first press member through the first syringe tube,

a second one of the tube block mechanisms has a second press member disposed movably at a position for pressing a second one of the syringe tubes and a second hold member disposed opposite to the second press member through the second syringe tube, and

the open or close interlock mechanism has a press pivot member having the first press member and the second press member formed integrally and supported pivotally.

5. The liquid injector according to claim 2, wherein a first one of the tube block mechanisms has a first press member disposed movably at a position for pressing a first one of the syringe tubes and a first hold member disposed opposite to the first press member through the first syringe tube,

a second one of the tube block mechanisms has a second press member disposed movably at a position for pressing a second one of the syringe tubes and a second hold member disposed opposite to the second press member through the second syringe tube, and

the open or close interlock mechanism has a crank member supported pivotally on its own trailing end, a first link member for connecting a leading end of the crank member to the first press member, and a second link member for connecting the leading end of the crank member to the second press member.

6. The liquid injector according to claim 2, wherein a first one of the tube block mechanisms has a first press member disposed movably at a position for pressing a first one of the syringe tubes and a first hold member disposed opposite to the first press member through the first syringe tube,

a second one of the tube block mechanisms has a second press member disposed movably at a position for pressing a second one of the syringe tubes and a second hold member disposed opposite to the second press member through the second syringe tube, and

the open or close interlock mechanism has a cam member supported pivotally and having a concave and a convex with which the first press member and the second press member engage.

7. The liquid injector according to any one of claims 2 to 6,

further comprising a first block sensor for sensing a first one of the syringe tubes being blocked and a second block sensor for sensing a second one of the syringe tubes being blocked,

wherein the interlock control means activates a second one of the syringe drive mechanisms after the first block sensor senses the blocking and activates a first one of the syringe drive mechanisms after the second block sensor senses the blocking.

8. The liquid injector according to any one of claims 1 to 7, further comprising a one-way valve for regulating the movement of the liquid in a direction from the syringe to the patient, the at least one one-way valve being provided for at least one of the patient tube and a plurality of the syringe tubes.